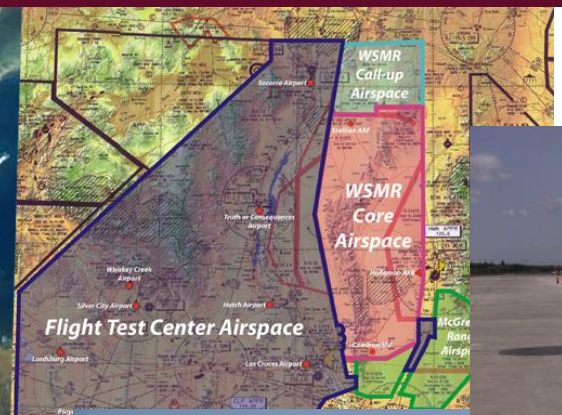
Physical Science Laboratory

All About Discovery! ™
New Mexico State University
nmsu.edu



0813 0100 NMSU Capability Statement Presentation NanoSat Lab

August 2019

Physical Science Laboratory
The Beginning

- Dr. James Van Allen contacted NMSU for War Department support (1946)
- Established in Physics Department to support V-2 rocket exploitation at WSPG—students provide data reduction support

30 Dec. 1946

George.

When you have a little time I should like to enquire as to your interest in

(a) establishing + manning an elementary electronics + mechanical shop on the grounds at W.S.P.G. for APL.

(b) Telemetering trucks + service for Aerobee.

(c) Handling, fueling, testing, launching + supervision of Aerobee.

(d) General headquarters for receipt + shipment of data, equipment in connection with V-2 and Aerobee program.

(e) etc.

J. A. Van Allen

PSL Overview

Multi-disciplined, aerospace- and defense-oriented scientific and technical organization

Facilities

- HQ located on NMSU campus
  - Controlled Access building
  - CONUS & OCONUS work locations
- Laboratory and production areas
- SCIF Compatible Space
  - Dedicated Labs and Production space
- UAS Flight Test Site at the Las Cruces, NM airport

Today's Domain Expertise

- 70 years in aerospace domain
- Modern electronic battlefield
- Provide IC solutions
- Information Sciences and Security Systems

Staff/Credentials

- Primarily applied HW/SW experts
- Variety of engineering, software, technologists, and scientists focused on user needs
- Access to on-campus faculty (with clearances)
- About 200 staff and temporary members, many with unique subject matter expertise

PSL Research Foci

Aligned around two major research foci

- Information Sciences and Security Systems
  - Infrastructure/Security
  - Systems Development and Integration
  - Modeling & Simulation (Information Modeling & Threat Analysis)
  - Electronic Countermeasures & Electronic Warfare
  - Cyber Security
- 21st Century Aerospace
  - Unmanned Aircraft Systems - FAA Approved UAS Flight Test Site
  - RDT&E Flight Operations
  - Missiles, Ballistic & Telemetry Systems
  - Operation and Test Support Services
  - Lighter-Than-Air Platforms
  - Engineering, Demonstrations, & Human Factors

Applicable skills and experience across all our business units!

PSL Capabilities

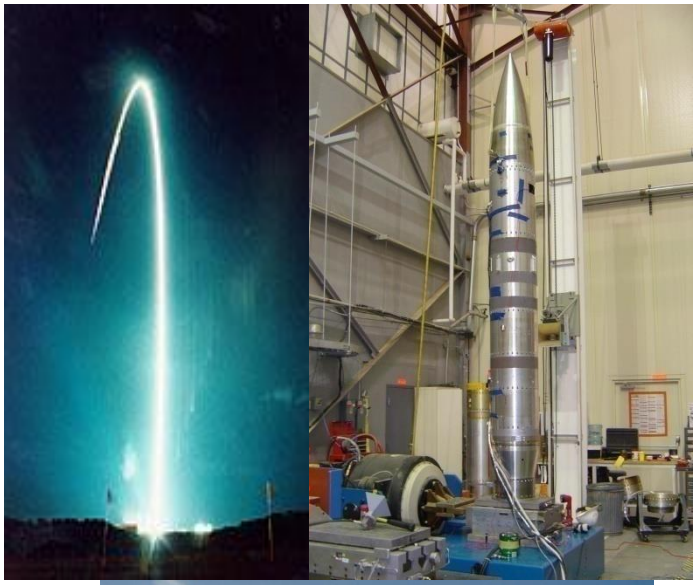
Concept Design, Develop, Integrate, Test, and Demo

PSL provides vehicle aviation and avionics system development and operational support for programs involving a wide variety of weapon development, target/evaluation, and scientific research platforms:

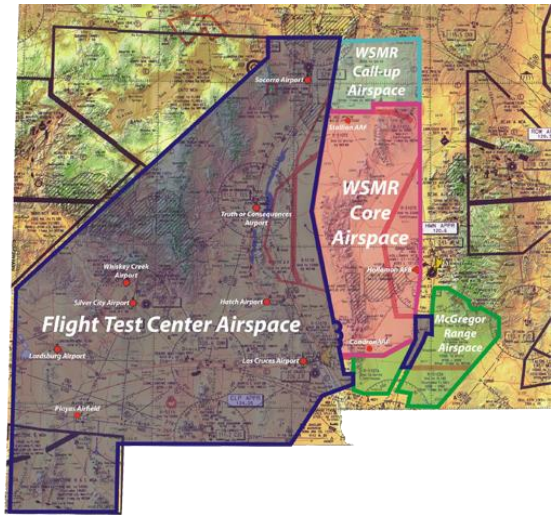
- Aircraft and Helicopters
- Unmanned Aircraft Systems
- RV/Decoy Suites
- Sensor and payload integration
- Spacecraft
- Rockets and Missiles
- Lighter than Air and Balloon Systems
- Ground Support and Target Systems

OPERATIONAL and TEST SUPPORT SERVICES

- Mission Planning and Operations
  - Operational Requirement documentation
  - Data product definition and distribution plans
  - Security and safety plans
  - Test/launch coordination and annotation
- Vehicle Systems
  - Flight systems integration and testing
  - Pyrotechnic systems preparation and handling
  - Land lines and umbilicals (copper and fiber optic)
  - Ground Support Equipment operation
- Telemetry ground stations
  - Receiving and recording
  - Real-time TM, television, and position displays
  - Data distribution systems (fiber optic & microwave)
  - Encryption and classified data systems
  - Equipment maintenance and configuration
- Post-mission data reduction and analysis support
  - Rapid post-mission data product processing and Data archival services



FAA Approved UAS Flight Test Site



Leading FTS for NAS Integration of UAS

- Long-term facility Certificate of Authorization
- 18 years of UAS FTS Ops and Flight Testing
- FAA-approved processes
- One of 7 FAA Approved UAS Test Sites

15,000 Square Miles of Airspace

- Exceptional Weather and Visibility
- Sparsely Populated
- Adjoins WSMR call-up area
- Terrain varies from desert to alpine forest

Enabling flight testing for any USG or industry user

Facilities and Assets

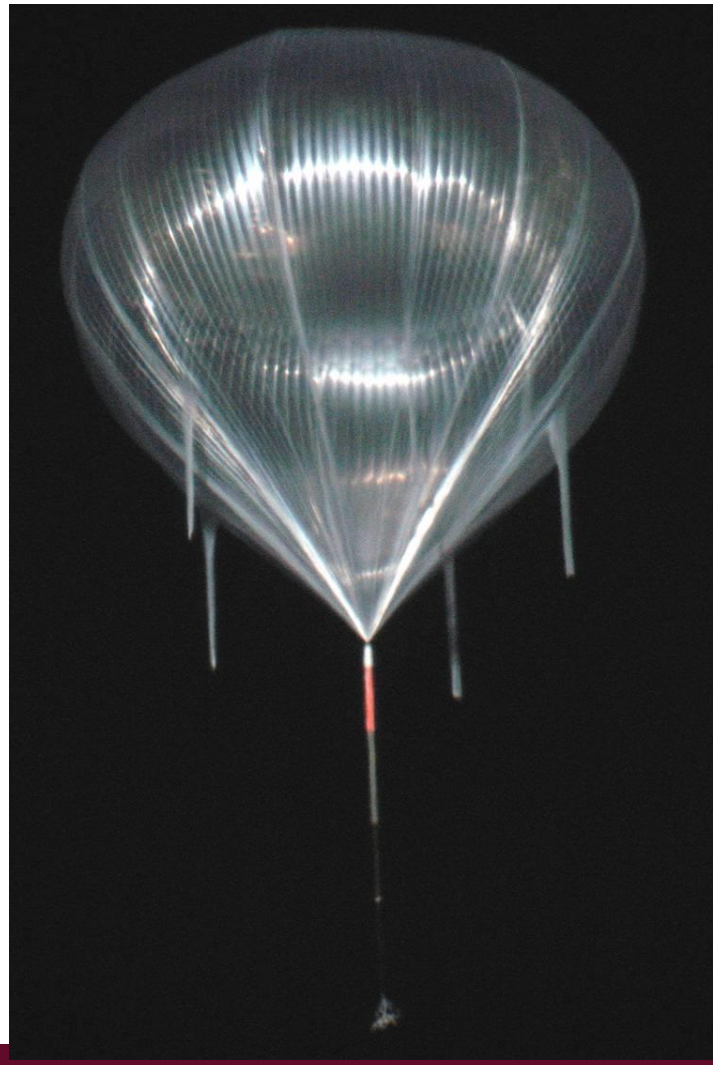
- 15,000 sq. ft. hangar
- Portable hangar and logistics support for remote operations
- Multiple UAS classes; Predator surrogate
- Chase aircraft

NMSU Airspace Experience

- NMSU performed special-use airspace throughout the U.S. and world with NASA for High-Altitude Ballooning for 30 years
- UAS airspace support of DoD, DHS, other U.S. Government efforts
- 18 years of UAS experience in NAS; 11 years of weekly flights in non-segregated airspace (airports and other)
- 365 days of flight test weather/year
- Excellent UAS safety record and FAA teaming history
- COA experience in multiple states; flight operations in multiple state and international locations
- CONUS and OCONUS flight operations
- Experience with many different small and large UAS systems

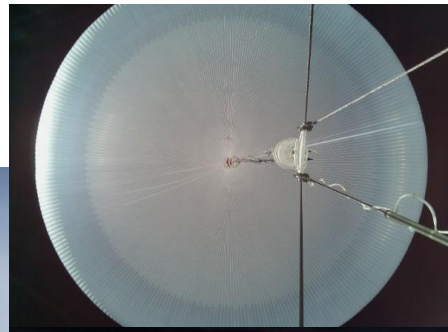
High Altitude Balloons

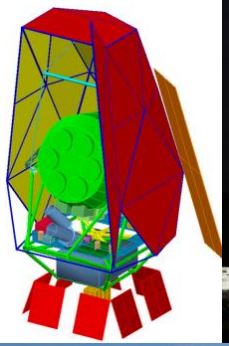
- Large, heavy payloads (up to 8,000 lbs)
- Near space environment
  (110,000-160,000 ft)
- Quick response
- Mobile, world wide operations
- Low cost
- Payloads can be re-flown
- Reasonable educational track for graduate students



Lighter Than Air – High Altitude Balloons

- PSL's 25+ years of management and operation of the NASA balloon program affords a wealth of technical and personal expertise unavailable anywhere else
- PSL has the key skills and capabilities in all aspects of high altitude balloons:
  - High altitude balloon design and analysis
  - Flight payload thermal analysis
  - Balloon flight support systems
  - Balloon launch operations
  - Launch and launch support equipment design & operation
- PSL's other business areas provide complimentary services/expertise that can be applied as needed





PSL Summary

- Applied research and engineering laboratory
- Domain expertise and aerospace and modern electronic battlefield
- Customers are primarily DoD, NASA, prime contractors, and industry
- Unique expertise in EW to include countermeasures for IED
- Unique expertise related to UAS, BVLOS, counter UAS, and special testing requirements
- Other unique expertise in support of the warfighter, IC, and national security
- Electronic and Mechanical prototyping capabilities, system design and integration, and RF & Antenna Capabilities
- Ability to integrate technical capabilities to achieve and push state-of-the-art solutions for customers